

REMARKS

The Office examined claims 1, 3-7, 9-11, 13-17, 19 and rejected same. With this paper, claim 1 is amended, none are canceled, and new claims 20 and 21 are added.

Claim Rejections under 35 USC §103

Claims 1, 3-7, 9-11, 13-17 and 19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nishiguchi et al. (JP 09-324096, Nishiguchi hereinafter) in view of Fujiwara et al. (EP 1 251 147 A1, Fujiwara hereinafter).

1. Fujiwara is not a valid prior art reference

Applicant respectfully submits that, the second reference Fujiwara was published by the European Patent Office on October 23, 2002. The European Patent Office's record also shows that a counterpart U.S. application (No. 10/122,306) was filed on April 16, 2002. Therefore, the earliest possible prior art date of Fujiwara would be April 16, 2002, assuming that the U.S. application 10/122,306 contains the same disclosure as the cited document EP 1 251 147 A1.

On the other hand, the present application claims priority to Japanese Patent Application 2001-395801, filed on December 27, 2001. Therefore, the effective filing date of the present application predates the effective prior art date of the Fujiwara reference. Fujiwara, or other correspondent publications thereof, cannot be used for the purpose of rejecting the claims in the present application.

A certified copy of the Japanese Patent Application 2001-395801 and a certified English translation thereof will be submitted shortly.

Applicant respectfully requests the above claim rejection based on Hara in view of Fujiwara be withdrawn.

2. Evidences supporting patentability

The polyvinyl alcohol (PVA) film of the present invention contains a plasticizer "trimethylolpropane" as an essential component. The trimethylolpropane is 0.1 to 50 parts by weight per 100 parts by weight of the polyvinyl alcohol resin. The PVA film of the present invention is characterized in that it has an α/β ratio of not more than 10, wherein α

is a storage modulus of the film at 20°C in a dry atmosphere and β is a storage modulus of the film at 20°C and 80% RH, and has a glass transition temperature of not more than 20°C.

In rejecting claim 1, the Office states that: "With regard to a ratio of storage modulus and a glass (transition) temperature instantly claimed in claim 1, the combined teaching of Nishiguchi and Fujiwara is silent about it. However, in view of substantially identical polyvinyl alcohol composition between Nishiguchi and Fujiwara and instant claim 1 (exactly the same polymerized monomers, degrees of hydrolysis, the difference in degree of hydrolysis, plasticizer and its amount, substantially identical method of the preparation of the final composition), it is the examiner('s) position that Nishiguchi and Fujiwara' polyvinyl alcohol composition possesses these properties." (Detailed Action, page 4, line 16 to page 5, line 1) Applicant respectfully disagrees with the Examiner's assertion that the polyvinyl alcohol film of the present invention and the film of Nishiguchi (or Fujiwara) have the identical properties.

As presented by the Applicant previously, there are evidences that the glass transition temperature of the PVA film of the present invention is lower than that of the film samples of Nishiguchi.

Usually, a glass transition temperature (T_g) of a polyvinyl acetate is about 30-40°C, and that of completely hydrolyzed polyvinyl alcohol (PVA) is about 70-80°C. The film of the present invention comprises trimethylolpropane as an essential plasticizer. The plasticizer composition is 0.1 to 50 parts by weight of per 100 parts by weight of the total of the PVA. The resulted PVA film has a T_g of not more than 20°C. Therefore, adding the plasticizer significantly reduces the T_g of the PVA.

The PVA film of the present invention is exemplified by the Examples 1, 2 and 3 in the specification. These examples exhibit T_g values of 6, 8 and 8°C, respectively. These film samples contain 20 parts by weight of trimethylolpropane per 100 parts by weight of the total of the PVA, and the polyvinyl alcohol resin (A) has a degree of hydrolysis from the range of 55 to 100% by mole.

On the other hand, Nishiguchi discloses working samples in which 3% glycerin is used as a plasticizer. Although Nishiguchi does not disclose the T_g of the PVA samples,

Applicant estimates that Tg of the film samples is more than 20°C based on the reasons shown below.

As mentioned in the previously filed responses, the elongation values of the Examples 1, 2 and 3 of the instant specification are 220, 210 and 330%, respectively, whereas the elongation values of Examples 1 to 6 of Nishiguchi are in the range of 95-140% (measured at 20°C). Thus, it is apparent that the Tg values of these samples must be higher than the temperature under which the elongation is measured (20°C).

Because of the low Tg, the PVA film of the present invention has excellent flexibility in ambient temperature and is very useful in packaging of liquid chemicals. If the Tg of the PVA film is more than 20°C, the mechanic strength of the film is significantly affected by the surrounding environment.

The plasticizer trimethylolpropane as claimed in claim 1 is essential in achieving a Tg of no more than 20°C in the PVA film of the present invention, and thus the lower Tg makes the PVA film of the present invention different from the PVA film of Nishiguchi. The plasticizer used by Nishiguchi, glycerin, at the disclosed composition, is not sufficient for achieving a Tg lower than 20°C and Nishiguchi fails to teach or suggest the effect of plasticizer on the Tg.

In a document "POVAL" submitted herewith, the author explains general characteristics of polyvinyl alcohol, and in Section 6-2 "Plasticizer" the document explains influence of plasticizer added to polyvinyl alcohol on the characteristics. As shown in Fig. 118 (glycerol contents vs. second order transition temperature), when 3 weight % of glycerol as plasticizer is added, Tg of the general polyvinyl alcohol remains around 50°C, which is much higher than the Tg of the polyvinyl alcohol in the present invention. A Tg of lower than 20°C cannot be achieved if the glycerol composition is less than 15 weight %. This figure is in agreement with the Applicant's experiment results presented in the specification where the Tg of the polyvinyl alcohol film having 10 weight % of glycerol is 25°C (Comparative Example 1) or 30°C (Comparative Example 2).

In a Declaration under 37 CFR 1.132, filed herewith, the Applicant submits additional evidence showing that both glass transition temperature and α/β ratio of the polyvinyl alcohol film disclosed in Nishiguchi is out of the range of the present invention.

An experiment was carried out to show differences between the polyvinyl alcohol films of the present invention and that of Nishiguchi. A sample film (S1) is formed according to the Example 1 of the present application, but instead of adding 20 parts of trimethylolpropane as the plasticizer, 3 parts of glycerol was added. This sample should be identical to the examples of Nishiguchi according to Examiner's allegation that the PVA compositions of the present application and that of Nishiguchi are substantially identical.

The sample film (S1) showed the following characteristics: Tg was 32°C, storage modulus α of the film in a dry atmosphere at 20°C was 3.8×10^8 Pa, and the storage modulus β of the film at 20°C and 80% RH was 6.3×10^6 Pa, thus the α/β ratio was 60.3 (see the following Table 1). Examples 1 and 2 as described in the present application are listed as a comparison.

Table 1

| | Film sample S1 | Example 1 | Example 2 |
|-----------------------------------|----------------|-----------|-----------|
| Glass Transition temperature (°C) | 32 | 6 | 8 |
| α/β ratio | 60.3 | 6.7 | 5.1 |

The above Table clearly shows the difference of Tg and the α/β ratio between Examples 1 or 2 and sample film (S1) which is substantially identical to the examples of Nishiguchi. Thus, the experimental data of the sample film (S1) demonstrates that polyvinyl alcohol film of the present invention possesses substantially different properties than the polyvinyl alcohol film of Nishiguchi.

Based on the above, claim 1 is patentable over Nishiguchi, either alone or in further view of Fujiwara. Withdrawal of the rejection is respectfully requested.

Claims 3-7, 9-11, 13-17 and 19 depend directly or indirectly from claim 1. Since claim 1 is believed to be patentable, these claims are also believed to be patentable due to their dependency. Applicant respectfully requests the rejections of all pending claims in the instant application be reconsidered and withdrawn.

Declaration under 37 CFR 1.132

The above mentioned Declaration under 37 CFR 1.132 is submitted herewith.
Consideration of the Declaration is respectfully requested.

Information Disclosure Statement

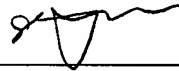
An Information Disclosure Statement listing the above-mentioned document
"POVAL" is filed herewith. Consideration of the document is respectfully requested.

Conclusion

For all the foregoing reasons, it is believed that all the claims of the instant
application are patentable, and their passage to issue is earnestly solicited. Applicant's
agent urges the Examiner to call to discuss the present response if anything in the present
response is unclear or unpersuasive.

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Respectfully submitted,



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